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Ex/P-XIV-O/2022

M. Sc. CHEMISTRY EXAMINATION, 2022

(4th Semester)

ORGANIC CHEMISTRY SPECIAL

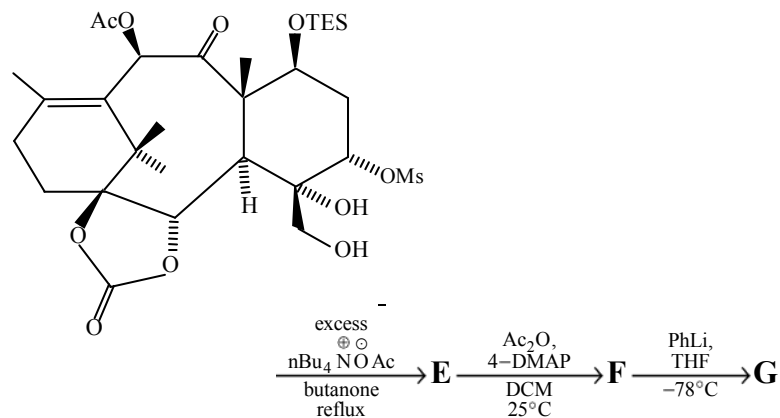
PAPER – XIV-O

Time : Two hours

Full Marks : 50

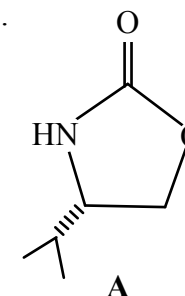
(25 marks for each unit)

Use a separate answer script for each Unit.



UNIT: O-4141

1. a) Design a scheme for the synthesis of 6-deoxy-L-galactose starting from a suitable easily available enantiopure D-aldohexose applying Chiron approach and suggest the corresponding synthetic sequence. 2+3
- b) Suggest a scheme for the synthesis of the following compound **A**.

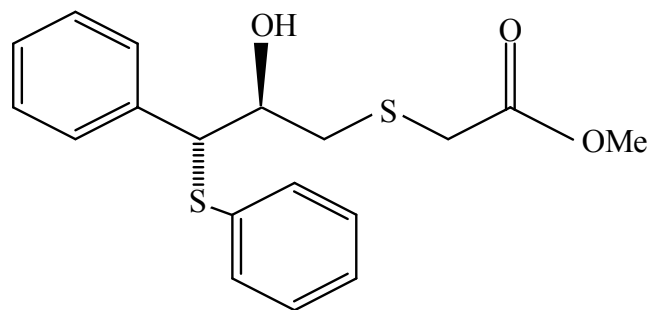


Discuss the role of **A** towards enantioselective alkylation of propanoic acid. 2+3

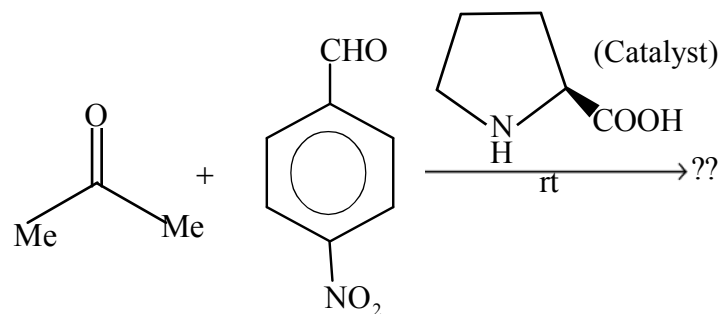
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[2]

- c) Delineate the asymmetric synthesis of the following compound **B** utilizing Sharpless asymmetric epoxidation protocol in one of the steps (only mention the steps with reagent, no mechanism is needed). 3

**B**

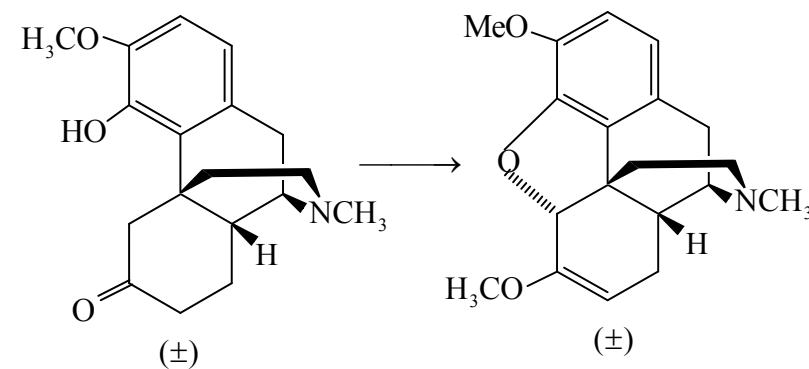
- d) Predict the major product of the following reaction and rationalize the stereochemical outcome with due emphasis to the catalytic cycle 1+4



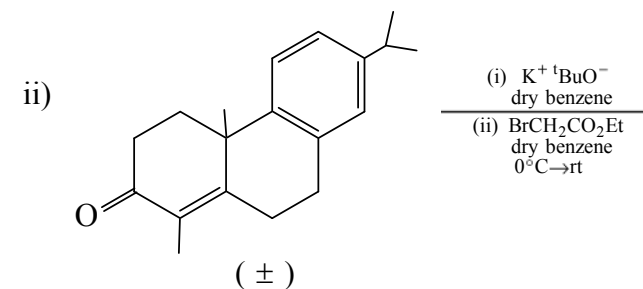
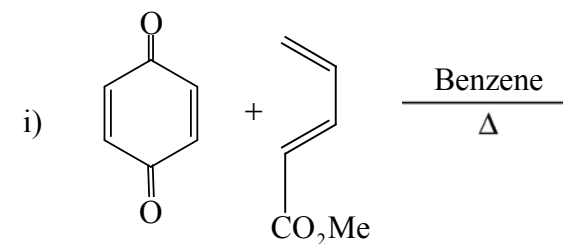
- e) Define the term “Sustainability”.

1

[5]



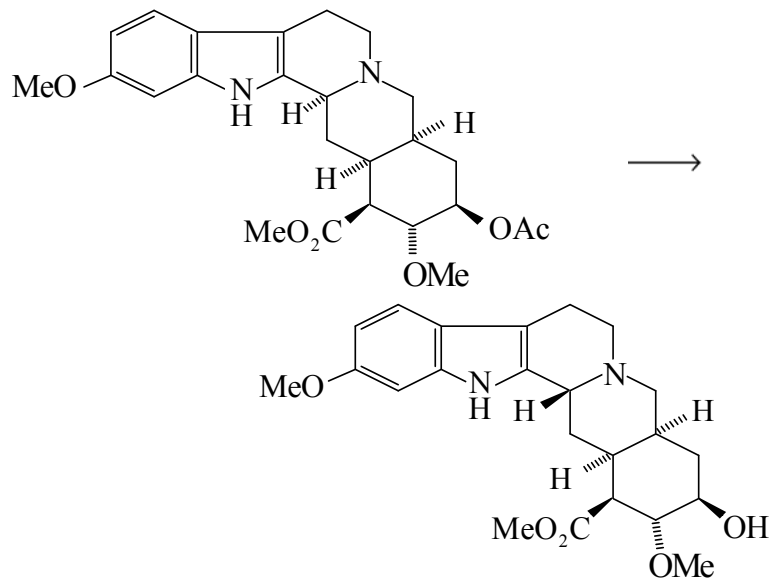
- f) Draw the structures of all the stereoisomeric products of the following reactions. Suggest proper mechanistic and stereochemical explanations for their formation. 2+2



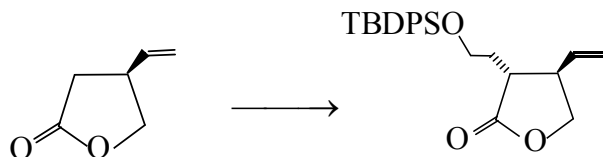
- g) Identify the products **E**, **F** and **G** of the following reactions. Mechanism is not required. 1½

[4]

- c) Outline the steps for the following conversion. Rationalize the mechanistic and stereochemical aspects of the epimerization process. 4



- d) How can you accomplish the following transformation? Show all the intermediate products. Comment on the stereoselectivity associated with this transformation. 3



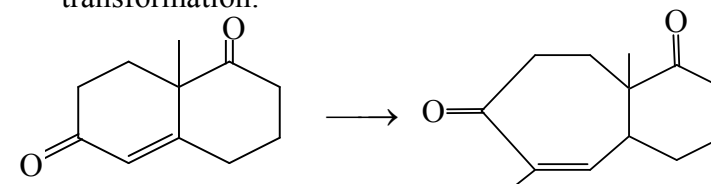
- e) Carry out the following transformation. Clearly mention all the intermediate products. No mechanism is required. 3

[3]

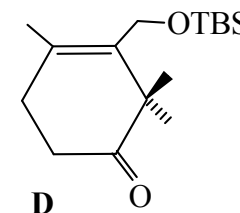
- f) Ethylbenzene reacts with potassium permanganate adsorbed on neutral alumina (moist) to produce C. Mechanically justify the formation of C. 4
- g) Mention important physicochemical attributes of RTIL. 2

UNIT: O-4142

2. a) Illustrate the steps involved in the following transformation. Show all the intermediate products. Provide mechanistic explanation for the ring expansion step only. Describe importance of all the reagents involved in the final three steps of this transformation. 5



- b) Prof. Nicolaou considered the following molecule **D** as versatile synthetic intermediate for construction of ring 'A' of Taxol. Explain why. Delineate the synthesis of this intermediate **D** starting from two acyclic molecules. Mechanistically explain the ring forming step only. 4½



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